UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,186	10/30/2003	Alex Melament	IL920030038US1	8171

7590   12/29/2005

Stephen C. Kaufman
Intellectual Property Law Dept.
IBM Corporation
P. O. Box 218
Yorktown Heights, NY 10598

EXAMINER
CAMPOS, YAIMA

ART UNIT	PAPER NUMBER
2185	

DATE MAILED: 12/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/697,186	MELAMENT ET AL.
	Examiner	Art Unit	
	Yaima Campos	2185	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _30 October 2003_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-14_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-14_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   The instant application having Application No. 10/927,186 has a total of 14

claims pending in the application; there are 4 independent claims and 10

dependent claims, all of which are ready for examination by the examiner.

I. INFORMATION CONCERNING OATH/DECLARATION

Oath/Declaration

The applicant's oath/declaration has been reviewed by the examiner and

is found to conform to the requirements prescribed in **37 C.F.R. 1.63**.

II. INFORMATION CONCERNING DRAWINGS

Drawings

2.   The applicant's drawings submitted are acceptable for examination

purposes.

III. OBJECTIONS TO THE SPECIFICATION

Specification Objections

3.   The disclosure is objected to because of the following informalities:

The word "will" (page 6, line 22) appears to be a typographical error. It is

believed this word should be "well" and has been treated as such for the rest of

this Office action.

Appropriate correction is required.

IV. REJECTIONS NOT BASED ON PRIOR ART

Claim Rejections - 35 USC § 112

4.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5.   **Claim 4** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per **claim 4**, claim 4 recites the limitation "performed substantially immediately after said backing up" in line 2. The word "substantially" renders the claim vague and indefinite because it fails to point out what is included/excluded by the claim language; it is also not clear the time frame that the word "immediately" encompasses. The examiner interprets this claim to read -- **transferring is performed after said backing up** -- and has been treated as such for the rest of this office action.

Claim 4 is also objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 4 appears to duplicate the contents of claim 1, the claim on which it depends.

Appropriate correction is required.

V. REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 103

6.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described
> as set forth in section 102 of this title, if the differences between the subject matter sought to
> be patented and the prior art are such that the subject matter as a whole would have been
> obvious at the time the invention was made to a person having ordinary skill in the art to which
> said subject matter pertains. Patentability shall not be negatived by the manner in which the
> invention was made.

7.   **Claims 1, 4, 6 and 13-14** are rejected under 35 U.S.C. 103(a) as being

unpatentable over Cooke, Jr. et al. (6,574,629) in view of Otterness et al. (US

6,460,122).

8.   As per **claims 1, 4, 6 and 13-14**, Cooke discloses "A method and system

of storage management," as **["the present invention is directed to a picture

archiving communication system which includes improved image routing,

retrieval and display capabilities" (Column 1, lines 8-10)]** "a program storage

device readable by machine, tangibly embodying a program of instructions

executable by the machine to perform method steps of storage management,"

and "a computer program product comprising a computer useable medium

having computer readable program code embodied therein of storage

management" **[With respect to these limitations, Cooke discloses that

"workstation 10 includes memory 21, which comprises a computer

readable medium such as one or more computer hard disks" and that

"PACS software modules comprise computer-executable code that defines**

process steps for effecting the various PACS functions of each

component/extension" (Figures 1,3 and Column 7, lines 42-45 and 54-58)]

"the method comprising: storing data on a high reliability high performance

storage medium" **[With respect to this limitation, Cooke discloses that an**

"archive station may comprise either a magneto optical disk (MOD)-based

archive station, or a digital linear tape (DLT)-based archive station" wherein

in a MOD-based archive, "the system uses hard disks" for "intermediate-

term storage" (Column 9, lines 10-14) as using a high reliability high

performance storage device. Cooke also discloses that "the portion of

short term storage, i.e., the RAID and other hard disks, which stores

images comprises the MOD-based archive's cache" (Column 9, lines 19-21)

"backing up said data on a high reliability low performance storage medium"

[Cooke discloses this limitation as "archive station which has access to

long-term memory for storing image data" (Column 2, lines 22-23) and

further teaches using "DLT media for long-term backup storage" (Column

9, lines 14-15)] "after said backing up, copying at least some of said data from

said high reliability high performance storage medium to a low reliability high

performance storage medium" **[With respect to this limitation, Cooke**

discloses that "the portion of short term storage, i.e., the RAID and other

hard disks, which stores images comprises the MOD-based archive's

cache" (Column 9, lines 19-21) as providing a high performance, low

reliability portion of memory within the high performance high reliability

storage]. Cooke also discloses "freeing space" in memory to prevent overflowing

as ["autopilot routine which patrols the archive's cache and which

automatically deletes studies once they have been archived on a MOD"

(Column 9, lines 36-38) as freeing space to prevent overflowing memory].

Cooke further the concept specified in claims 1, 6, and 13-14 as [a "three-tiered

storage system" having a short term, intermediate term and long term

storages (Column 9, lines 10-21)].

Cooke does not disclose expressly moving data from a high performance

high reliability storage to high performance low reliability storage to "free space

occupied thereby on the high reliability high performance storage medium."

Otterness discloses moving data from a high performance high reliability

storage to high performance low reliability storage to "free space occupied

thereby on the high reliability high performance storage medium." Otterness

teaches computer memory management comprising different cache levels

["level 0 (primary cache)" and "remote cache" (secondary cache level)

which is referred to as "level 1 to n" (Column 4, lines 42-50). Otterness also

teaches that "the caching algorithms are designed to move data between

various cache levels to free up space in certain caches and to adjust for

various host computer access patterns" (Column 6, lines 28-31). Otterness

explains that "The "level 0" cache is considered the first level of interaction

with host operations. Data is moved to and from the level 0 cache to the

host computer system. The level 0 cache is also the fastest" (Column 20,

lines 57-60)] as having a short term memory comprising a first high performance

high reliability portion and a second high performance low reliability portion and

migrating data from the first portion to the second portion to free space on the

first portion.

(US 6,574,629) by Cooke, Jr. et al. and (US 6,460,122) by Otterness et al.

are analogous art because they are form the same field of endeavor of computer

memory management and back-up.

At the time of the invention it would have been obvious to a person of

ordinary skill in the art to combine the computer memory back-up system/method

including short, intermediate and long term storages taught by Cooke further

include the ability of moving data within different portions of short term storage to

free space occupied on one of these portions as taught by Otterness.

The motivation for doing so would have been because Otterness teaches

that ["data is moved into various cache levels based upon host operation"

to "optimize the availability of data and the availability of cache lines within

a cache level" (Column 5, lines 59-60 and 62-63)].

Therefore, it would have been obvious to combine Otterness et al. (US

6,460,122) and Cooke, Jr. et al. (US 6,574,629) for the benefit of creating a

memory management system and method to obtain the invention as specified in

claims 1, 4, 6 and 13-14.

9.   As per **claim 5**, the combination of Cooke and Otterness discloses "the

method of claim 1" **[See rejection to claim 1 above]**, "wherein said data

includes medical images" **[With respect to this limitation, Cooke discloses

that "the invention has particular utility in a hospital, or group of hospitals,**

since it facilitates inter-departmental access to patient images produced by

different types of imaging modalities" (Column 1, lines 11-14)].

10.   As per **claims 7 and 8**, the combination of Cooke and Otterness

discloses "the system of claim 6," **[See rejection to claim 6 above]** "further

comprising: a storage policy sub-unit configured to determine when to backup

data on said low performance high reliability storage medium" and "when to

transfer data from said high performance high reliability storage medium to said

high performance low reliability storage medium" **[With respect to this**

limitation, Cooke teaches that "network gateway" controls routing of

studies "to selected PACS core components and extensions, and pre-

fetching and routing of relevant prior studies between the archive and

reviewing stations" and explains that "rules for routing and pre-fetching

studies may be based on a number of factors" (Column 10, lines 22-28)

wherein "the pre-fetching rules are used to determine which prior studies

on the PACS should be retrieved. Once this is done, the prior studies are

copied into the archive station's cache (or, alternatively, the network

gateway's cache) and routed to the appropriate stations automatically"

(Column 19, lines 9-14). Cooke also explains that each MOD-based

workstation "provides both manual and automatic control of data migration

from short term storage to the MODs" (Column 9, lines 28-30)].

11.   As per **claim 9**, the combination of Cooke and Otterness discloses "the

system of claim 6," **[See rejection to claim 6 above]** "wherein said high

performance low reliability storage medium is higher volume than said high

performance high reliability storage medium" [With respect to this limitation,

Cooke teaches that "the mod-based archive station includes a three-tiered

storage system that uses hard disks for online data storage, MODs for

intermediate-term data storage, and DLT media for long-term backup

storage" (Column 10, lines 10-16). Cooke also specifies that "Additional

RAID ("Redundant Array of Inexpensive Disks") may also be provided for

expanded short term storage, depending upon the storage requirements of

the facility and the number of studies handled thereby. The portion of short

term storage, i.e., the RAID and other hard disks, which stores images

comprises the MOD-based archive's cache" (Column 9, lines 16-21) as

specifying that a high performance, low reliability portion of memory may

be expanded to store a greater amount of data].

12.   As per **claim 10**, the combination of Cooke and Otterness discloses "the

system of claim 6," [See rejection to claim 6 above] "wherein said high

reliability high performance storage medium is configured to have a mean time

between failure which is at least ten times higher than a mean time between

failure which said low reliability high performance storage medium is configured

to have" [With respect to this limitation, Cooke discloses that by allowing

"retrieval of image data from caches, rather than requiring that image data

be retrieved from the archive (as is the case in the invention's conventional

counterparts), the invention reduces image retrieval time, and thus

increases the system's efficiency" (Column 4, lines 5-14) as providing a

cache for short term storage within archive stations. At the time of the

invention, it is well known in the art that a cache memory is used for short-term data storage and that cache memory is faster but less reliable than main memory; therefore, Cooke discloses having a portion of memory for short-term storage wherein a mean time between failures is lower than a main portion of memory].

13.   As per **claim 11**, the combination of Cooke and Otterness discloses "the system of claim 6," **[See rejection to claim 6 above]** wherein said high reliability high performance storage medium is configured to allow at least ten times as many random read/write/rewrite operations per unit of time as said high reliability low performance storage medium is configured to allow" **[Cooke discloses this concept as it is explained that "images in PACS component caches may be more accessible than those on the archive may be. Thus, by permitting retrieval of image data from caches, rather than requiring that image data be retrieved from the archive (as is the case in the invention's conventional counterparts), the invention reduces image retrieval time, and thus increases the system's efficiency" (Column 4, lines 5-14) as specifying having a cache as a faster portion of memory than long-term storage in order to allow more read/write operations per unit of time]**. Otterness further discloses this concept as **["a multiple level cache structure and multiple level caching method that distributes input/output processing loads including caching between the plurality of processors to provide higher performance input/output processing" (Column 2, lines 46-50)]**.

14.   As per **claim 12**, the combination of Cooke and Otterness discloses "the

system of claim 6," **[See rejection to claim 6 above]** "further comprising: a third

level of storage comprising at least one low performance high reliability storage

media disconnected from said high performance high reliability medium" **[With**

respect to this limitation, Cooke discloses having "MODs (i.e., high-

capacity, removable storage media" (Column 9, line 13)]. Additionally,

Otterness discloses using **["tape as a backup storage (which would be**

considered the level 3)" (Column 6, lines 40-41)].

15.   Claims **2 and 3** are rejected under 35 U.S.C. 103(a) as being

unpatentable over Cooke, Jr. et al. (US 6,574,629) and Otterness et al. (US

6,460,122) as applied to **claims 1, 4, 6, and 13-14** above, and further in view of

Mizrachi et al. (US 2003/0033486).

16.   As per **claims 2 and 3**, the combination of Cooke and Otterness discloses

"the method of claim 1," **[See rejection to claim 1 above]**, but fails to disclose

expressly that "data is classified according to characteristics thereof and is

backed up at a rate that is dependent on the respective characteristics of said

data" wherein "said data is backed up at a rate dependent on at least one from a

group including at least: an occupancy level of said high reliability high

performance storage, availability of back-up media and access to said high

reliability low performance storage medium."

        Mizrachi teaches a memory management method/system wherein "data is

classified according to characteristics thereof and is backed up at a rate that is

dependent on the respective characteristics of said data" wherein "said data is

backed up at a rate dependent on at least one from a group including at least: an

occupancy level of said high reliability high performance storage, availability of

back-up media and access to said high reliability low performance storage

medium." Mizrachi discloses this concept as ["**a method and apparatus for**

using estimated communication rates in a cache replacement algorithm"

(Column 2, paragraph 0017, lines 2-4), teaches that "a rate estimator,

coupled to the mapper, dynamically determines relative rates of active

connections. The rates are used to classify the connections as fast or

slow" (Column 2, paragraph 0018, lines 13-16) and also discloses that

"partitioning the cache memory includes partitioning the cache memory

into first and second areas of the cache memory" (Column 3, paragraph

0073) and specifies the existence of "first and second cache memories,

coupled to receive and hold context information from an external memory

with respect to a plurality of tasks, each task activated by one or more

activating events, so that the context information is available for access by

a processor in performing the tasks" (Column 3, paragraph 0029)].

(US 6,574,629) by Cooke, Jr. et al., (US 6,460,122) by Otterness et al.

and (US 2003/0033486) by Mizrachi et al., are analogous art because they are

form the same field of endeavor of computer memory management.

At the time of the invention it would have been obvious to a person of

ordinary skill in the art to combine the computer memory back-up system and

method including short, intermediate and long term storages taught by Cooke

further include the ability of moving data within different portions of short term

storage to free space occupied on one of these portions as taught by Otterness

and further classify and migrate data based on transfer rate information as taught

by Mizrachi.

The motivation for doing so would have been because Mizrachi teaches

that ["**using a partitioned cache architecture based on rate estimation**

minimizes slow external memory accesses by assuring that context

information for faster connection resides in fast internal memory" **(Column**

3, paragraph 0024)].

Therefore, it would have been obvious to combine Mizrachi et al. (US

2003/0033486) with Otterness et al. (US 6,460,122) and Cooke, Jr. et al. (US

6,574,629) for the benefit of creating a memory management system/method to

obtain the invention as specified in claims 2-3.

VI. <u>RELEVANT ART CITED BY THE EXAMINER</u>

17.   The following prior art made of record and not relied upon is cited to

establish the level of skill in the applicant's art and those arts considered

reasonably pertinent to applicant's disclosure. See **MPEP 707.05(c)**.

18.   The following references teach migration of data from one cache

portion/partition/section to another.

<u>U.S. PATENT NUMBER</u>

US 6,442,601

US 5,148,537

19.   The following references teach memory management including primary

and secondary portions of memory.

U.S. PATENT NUMBER

US 6,549,992

US 6,609,183

VII. CLOSING COMMENTS

Conclusion

a. STATUS OF CLAIMS IN THE APPLICATION

20.   The following is a summary of the treatment and status of all claims in the

application as recommended by M.P.E.P. 707.07(i):

a(1) CLAIMS REJECTED IN THE APPLICATION

21.   Per the instant office action, **claims 1-14** have received a first action on

the merits and are subject of a first action non-final.

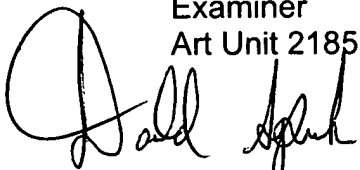#### b. DIRECTION OF FUTURE CORRESPONDENCES

22.   Any inquiry concerning this communication or earlier communications from

the examiner should be directed to Yaima Campos whose telephone number is

(571) 272-1232 and email address is Yaima.Campos@uspto.gov. The examiner

can normally be reached on Monday to Friday 8:30 AM to 5:00 PM.

IMPORTANT NOTE

23.   If attempts to reach the above noted Examiner by telephone or email are

unsuccessful, the Examiner's supervisor, Mr. Donald Sparks, can be reached at

the following telephone number: Area Code (571) 272-4201.

The fax phone number for the organization where this application or

proceeding is assigned is 571-273-8300. Information regarding the status of an

application may be obtained from the Patent Application Information Retrieval

(PAIR) system. Status information for published applications may be obtained

from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about

the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on

access to the Private PAIR system, contact the Electronic Business Center

(EBC) at 866-217-9197 (toll-free).

December 20, 2005   Yaima Campos
                                                    Examiner
                                                    Art Unit 2185

DONALD SPARKS
SUPERVISORY PATENT EXAMINER